We claim:

1. A tri(alkylcarboxylato) gallium (III) product formed by the reaction of at least one alkyl carboxylate compound of structure

$$[R\text{-}CO_2]_XM$$

wherein R is a linear or branched alkyl group having from 2 to about 26 carbon atoms and M is selected from the group consisting of hydrogen and the alkali metals when X is 1, and the alkaline earth metals when X is 2; with a gallium salt.

2. The tri(alkylcarboxylato) gallium (III) product of claim 1 wherein the gallium salt is selected from the group consisting of gallium acetate, gallium nitrate, and the gallium halides.

3. The tri(alkylcarboxylato) gallium (III) product of claim 2 wherein, when M is hydrogen, the reaction is carried out in the presence of an inorganic base.

4. The tri(alkylcarboxylato) gallium III product of claim 3 wherein the inorganic base is an alkali metal carbonate or bicarbonate, an alkaline earth metal carbonate or bicarbonate, or an alkali metal hydroxide.

5. The tri(alkylcarboxylato) gallium (III) product of claim 1 wherein R has from 3 to about 17 carbon atoms.

6. The tri(alkylcarboxylato) gallium (III) product of claim 5 wherein R is a linear or branched alkyl group having 3, 5, 7, 11, 13, 15, or 17 carbon atoms.

7. The tri(alkycarboxalato) gallium (III) product of claim 6 wherein R has 15 carbon atoms.

8. The product of claim 1 wherein the reaction is carried out in the presence of a solvent that comprises an «alkyl alcohol» selected from the group consisting of methanol, ethanol, n-propanol, iso-propanol, 2-butanol, t-butanol, and iso-butanol.

9. The tri(alkycarboxalato) gallium (III) product of claim 8 wherein the solvent further comprises water.

10. The tri(alkylcarboxylato) gallium (III) product of claim 9 wherein the reaction is carried out in refluxing solvent comprising an alkyl alcohol and water at pH equal to or greater that about 8.

11. A tri(alkylcarboxylato) gallium (III) product of formula

$$[RCO_2][R'CO_2][R''CO_2]Ga,$$

wherein R, R', and R'' are each, independently, a linear or branched alkyl group having from 1 to about 26 carbon atoms, with the proviso that at least one of R, R', and R'' is other than methyl.

12. The tri(alkylcarboxylato) gallium (III) product of claim 11 wherein R, R', and R" each have, independently, 1, 2, 3, 5, 7, 11, 15, or 17 carbon atoms.

13. A tri(alkylcarboxylato) gallium (III) product of formula

$$[RCO_2]_3Ga$$

wherein R is a linear or branched alkyl group having from 2 to about 26 carbon atoms.

14. The tri(alkylcarboxylato) gallium (III) product of claim 13 wherein R has 2, 5, 7, 11, 15, or 17 carbon atoms.

15. Tripalmitato gallium (III).

16. A method of making a tri(alkylcarboxylato) gallium (III) product comprising the step of reacting at least one alkyl carboxylate compound of structure

$$[R\text{-}CO_2]_XM$$

wherein R is a linear or branched alkyl group having from 2 to about 26 carbon atoms and M is selected from the group consisting of hydrogen and the alkali metals when X is 1, and the alkaline earth metals when X is 2; with a gallium salt.

17. The method of claim 16 wherein the gallium salt is selected from the group consisting of gallium acetate, gallium nitrate, and the gallium halides.

18. The method of claim 16 wherein the alkyl carboxylate compound is initially in solution.

19. The method of claim 16 wherein the reacting is carried-out in the presence of a solvent that comprises an alkyl alcohol, wherein the alkyl alcohol is selected from the group consisting of methanol, ethanol, n-propanol, iso-propanol, 2-butanol, t-butanol, and iso-butanol.

20. The method of claim 19 wherein the alkyl alcohol is ethanol.

21. The method of claim 19 wherein the solvent further comprises water.

22. The method of claim 16 wherein the at least one alkyl carboxylate compound comprises a mixture of two or more alkyl carboxylate compounds selected from $[RCO_2]_XM$, $[R'CO_2]_XM$, and $[R''CO_2]_XM$, wherein R, R', and R'' are, independently, a linear or branched alkyl group having from 2 to about 26 carbon atoms, with the proviso that the mixture includes at least two different alkyl carboxylate compounds.

23. A method of making a tri(alkylcarboxylato) gallium (III) product comprising the steps of:

a) contacting a solution of at least one alkyl carboxylate compound of structure

$$[R\text{-}CO_2]_XM$$

wherein R is a linear or branched alkyl group having from 2 to about 26 carbon atoms and M is either an alkali metal when X is 1 or an alkaline earth metal when X is 2 in a first solvent comprising an alkyl alcohol, with a gallium salt or with a solution of a gallium salt in a second solvent comprising an alkyl alcohol,

b) evaporating the resulting solution to dryness at reduced pressure, and

c) drying the residue to constant weight to obtain the tri(alkylcarboxylato) gallium (III) product.

24. The method of claim 23 wherein the at least one alkyl carboxylate compound comprises a mixture of two or more alkyl carboxylate compounds selected from $[RCO_2]_xM$, $[R'CO_2]_xM$, and $[R''CO_2]_xM$, wherein R, R', and R'' are, independently, a linear or branched alkyl group having from 2 to about 26 carbon atoms, with the proviso that the mixture includes at least two different alkyl carboxylate compounds.

25. The method of claim 23 wherein the alkyl alcohol of the first and second solvents is ethanol.

26. The method of claim 23 wherein the first and second solvents further comprise water.

27. The method of claim 23 wherein the alkyl carboxylate compound of step (a) is prepared by reacting at least one alkyl carboxylic acid with an inorganic base in the presence of a solvent that comprises an alkyl alcohol.

28. The method of claim 27 wherein the solvent in the presence of which the alkyl carboxylate compound is prepared further comprises water.

29. The method of claim 28 wherein the solvent in the presence of which the alkyl carboxylate compound is prepared consists essentially of ethanol and water.

30. The method of claim 27 wherein the inorganic base is selected from the group consisting of the alkali metal carbonates and the alkaline earth metal carbonates.

31. A pharmaceutical composition comprising a tri(alkylcarboxylato) gallium (III) product of formula

$$[RCO_2][R'CO_2][R''CO_2]Ga$$

wherein R, R', and R'' are each, independently, a linear or branched alkyl group having from 1 to about 26 carbon atoms, and at least one pharmaceutically acceptable excipient.

32. The pharmaceutical composition of claim 31 wherein R, R', and R'' each have, independently, 2, 3, 5, 7, 11, 15, or 17 carbon atoms.

33. The pharmaceutical composition of claim 31 wherein the tri(alkylcarboxylato) gallium (III) compound can be represented by the formula

$$[RCO_2]_3Ga$$

wherein R is a linear or branched alkyl group having 1 to about 26 carbon atoms, and at least one pharmaceutically acceptable excipient.

34. A pharmaceutical composition comprising a tri(alkylcarboxylato) gallium (III) product formed by the reaction of at least one alkyl carboxylate compound of structure

$$[R\text{-}CO_2]_XM$$

wherein R is a linear or branched alkyl having from 2 to about 26 carbon atoms and M is selected from the group consisting of hydrogen and the alkali metals when X is 1, and the alkaline earth metals when X is 2; with a gallium salt, and at least one pharmaceutically acceptable excipient.

35. A method of treating a disease characterized by increased bone resorption in a mammal comprising administering to the mammal suffering from such disease an amount of a tri(alkylcarboxylato) gallium (III) product effective to treat the disease, wherein the tri(alkylcarboxylato) gallium (III) product can be represented by the formula

$$[RCO_2][R'CO_2][R''CO_3]Ga$$

wherein R, R', and R'' are each, independently a linear or branched alkyl group having from 1 to about 26 carbon atoms.

36. The method of claim 35 wherein the tri(alkylcarboxylato) gallium (III) product can be represented by the formula

$$[RCO_2]_3Ga$$

wherein R is a linear or branched alkyl group having from 1 to about 26 carbon atoms.

37. The method of claim 35 wherein the disease characterized by increased bone resorption is selected from the group consisting of osteoporosis, cancer-associated

hypercalcemia, multiple myeloma, hyperparathyroidism, Paget's disease, and bone metastases.

38. The method of claim 34 wherein the mammal is a human.

39. A method of treating a disease characterized by increased bone resorption, in a mammal suffering from such disease comprising the step of administering to the mammal an amount of a «tri(alkylcarboxylato) gallium (III) product» effective to treat such disease, wherein the tri(alkylcarboxylato) gallium (III) compound is formed by the reaction of at least one alkyl carboxylate compound of structure

$$[R\text{-}CO_2]_XM$$

wherein R is a linear or branched alkyl group having from 2 to about 26 carbon atoms and M is selected from the group consisting of hydrogen and the alkali metals when X is 1, and the alkaline earth metals when X is 2; with a gallium salt.

wherein the disease is selected from the group consisting of osteoporosis, cancer-associated hypercalcemia, multiple myeloma, hyperparathyroidism, Paget's disease, and bone metastases.

40. The method of claim 39 wherein the mammal is a human.

41. A method of treating an inflammatory or autoimmune disease in a mammal comprising the step of administering to the mammal an amount of a tri(alkylcarboxylato) gallium (III) compound effective to treat the disease, wherein the tri(alkylcarboxylato) gallium (III) compound can be represented by the formula

$$[RCO_2][R'CO_2][R''CO_3]Ga$$

wherein R, R', and R'' are each, independently a linear or branched alkyl group having from 1 to about 26 carbon atoms.

42. The method of claim 41 wherein the tri(alkylcarboxylato) gallium (III) compound can be represented by the formula

$$[RCO_2]_3Ga,$$

wherein R is a linear or branched alkyl group having from 1 to about 26 carbon atoms.

43. The method of claim 41 wherein the inflammatory or autoimmune disease is a macrophage-mediated inflammatory or autoimmune disease.

44. The method of claim 43 wherein the inflammatory or autoimmune disease is selected from the group consisting of endotoxic shock, inflammatory pulmonary disease, type I diabetes, and systemic lupus erythematosus.

45. The method of claim 41 wherein the mammal is a human.

46. A method of treating an inflammatory or autoimmune disease in a mammal suffering from such disease comprising the step of administering to the mammal an amount of a tri(alkylcarboxylato) gallium (III) product effective to treat the disease wherein the tri(alkylcarboxylato) gallium (III) product is formed by the reaction of at least one alkyl carboxylate compound of structure

$$[R\text{-}CO_2]_XM$$

wherein R is a linear or branched «alkyl group» having from 2 to about 25 carbon atoms and M is selected from the group consisting of hydrogen and the alkali metals when X is 1, and the alkaline earth metals when X is 2; with a gallium salt.

47. The method of claim 46 wherein the inflammatory or autoimmune disease is a macrophage mediated autoimmune disease.

48. The method of claim 47 wherein the inflammatory or autoimmune disease is selected from the group consisting of endotoxic shock, inflammatory pulmonary disease, type I diabetes, and systemic lupus erythematosus.

49. The method of claim 46 wherein the mammal is a human.

50. A method of treating a neoplastic disease in a mammal suffering from a neoplastic disease comprising the step of administering to the mammal an amount of a tri(alkylcarboxylato) gallium (III) product effective to treat the disease, wherein the tri(alkylcarboxylato) gallium (III) product can be represented by the formula

$$[RCO_2][R'CO_2][R''CO_3]Ga$$

wherein R, R', and R'' are each, independently, a linear or branched alkyl group having from 1 to about 26 carbon atoms.

51. The method of claim 50, wherein the tri(alkylcarboxylato) gallium (III) product can be represented by the formula

$$[RCO_2]_3Ga,$$

wherein R is a linear or branched alkyl group having from 1 to about 26 carbon atoms.

52. The method of claim 50 wherein the neoplastic disease is a hematological neoplastic disease.

53. The method of claim 52 wherein the neoplastic disease is non-Hodgkin's lymphoma.

54. The method of claim 50 wherein the mammal is a human.

55. A method of treating a neoplastic disease in a mammal suffering from a neoplastic disease comprising the step of administering to the mammal a neoplastic disease-treating effective amount of a tri(alkylcarboxylato) gallium (III) product formed by the reaction of at least one alkyl carboxylate compound of structure

$$[R\text{-}CO_2]_XM$$

wherein R is a linear or branched alkyl group having from 2 to about 25 carbon atoms and M is selected from the group consisting of hydrogen and the alkali metals when X is 1, and the alkaline earth metals when X is 2; with a gallium salt.

56. The method of claim 55 wherein the neoplastic disease is a hematological disease.

57. The method of claim 55 wherein the neoplastic disaease non-Hodgkin's lymphoma.

58. The method of claim 55 wherein the mammal is a human.